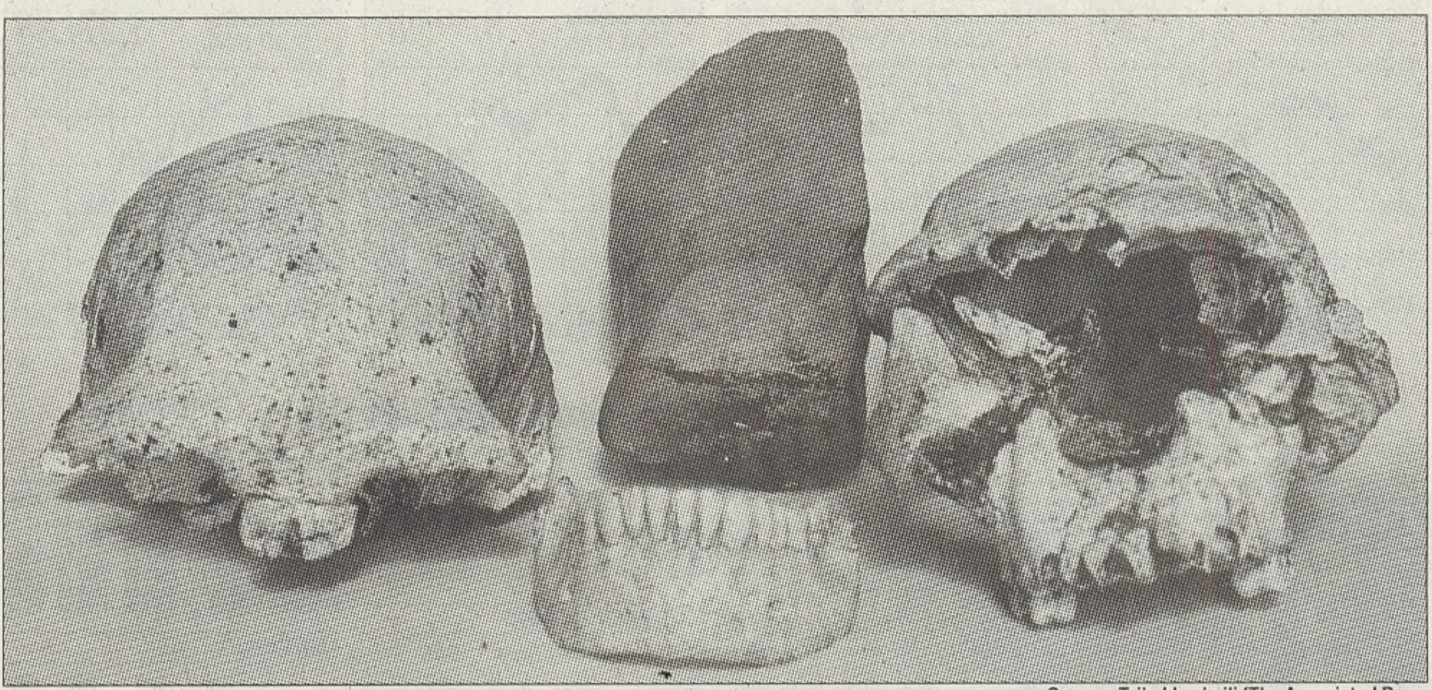

Gouram Tsibakhashvili/The Associated Press

These skulls found in the Republic of Georgia are challenging current theories about the human family tree.

Ancient bones of contention

By John Noble Wilford

The New York Times

NEW YORK

Two ancient skulls, one from central Africa and the other from the Black Sea republic of Georgia, have shaken the human family tree to its roots, sending scientists scrambling to see if their favorite theories are among the fallen fruit.

Probably so, according to paleontologists, who may have to make major revisions in the human genealogy and rethink some of their ideas about the first migrations out of Africa by human relatives.

Yet, despite all the confusion and uncertainty that the skulls have caused, scientists speak in superlatives of their potential for revealing crucial insights in the evidence-disadvantaged field of human evolution.

The African skull dates from nearly 7 million years ago, close to the fateful moment when the human and chimpanzee lineages went their separate ways. The 1.75-million-year-old Georgian skull could answer questions about the first human ancestors to leave Africa, and why they ventured forth.

Still, it was a shock for two such momentous discoveries to be reported independently in a single week, as happened in July. "I can't think of another month in the history of paleontology in which two such finds of importance were published," said Bernard Wood, a paleontologist at George Washington University.

Every decade or two, a fossil discovery upsets conventional wisdom.

One more possible "missing link" emerges. An even older member of the hominid group, those human ancestors and their close relatives (but not apes), decide where they belong, if at all, in the human lineage.

At each turn, the family tree has had to be reconfigured with more branches leading here and there and, in some cases, apparently nowhere.

"When I went to medical school in 1963, human evolution looked like a ladder," Wood said. The ladder, he explained, stepped from monkey to modern human through a progression of intermediates, each slightly less apelike than the previous one.

But the fact that modern Homo sapiens is the only hominid living today is quite misleading, an exception to the rule dating only since the demise of Neanderthals some 30,000 years ago. Fossil hunters keep finding multiple species of hominids that overlapped in time, reflecting evolutionary diversity in response to new or changed circumstances. Not all of them could be direct ancestors of Homo sapiens. Some presumably were dead-end side branches.

So a tangled bush has now replaced a tree as the ascendant imagery of human evolution.

Most scientists studying the newfound African skull think it lends strong support to hominid bushiness almost from the beginning.

That is one of several reasons Daniel Lieberman, a biological anthropologist at Harvard, called the African specimen "one of the greatest paleontological discoveries of the past 100 years."

The skull was uncovered in the desert of Chad by a French-led team under the direction of Michel Brunet of the University of Poitiers. Struck by the skull's unusual mix of apelike and evolved hominid features, the discoverers assigned it to an entirely new genus and species — *Sahelanthropus tchadensis*. It is more commonly called journal Nature, Brunet's group said that the fossils — a cranium, two lower jaw fragments and several teeth — promised "to illuminate the earliest chapter in human evolutionary history."

The age, face and geography of the new specimen were all surprises.

About a million years older than any previously recognized hominid, Toumai lived close to the time that molecular biologists think was the earliest period in which the human lineage diverged from the chimpanzee branch. The next oldest hominid appears to be the 6-million-year-old *Orrorin tugenensis*, found two years ago in Kenya but not yet fully accepted by many scientists. After it is *Ardipithecus ramidus*, which probably lived 4.4 million to 5.8 million years ago in Ethiopia.

"A lot of interesting things were happening earlier than we previously knew," said Eric Delson, a paleontologist at the City University of New York and the American Museum of Natural History.

The most puzzling aspect of the new skull is that it seems to belong to two widely separated evolutionary periods. Its size indicates that Toumai had a brain comparable to that of a modern chimp, about 320 to 380 cubic centimeters.

Yet the face is short and relatively flat, compared to the protruding faces of chimps and other early hominids. Indeed, it is more humanlike than the "Lucy" species, *Australopithecus afarensis*, which lived more than 3.2 million years ago.

"A hominid of this age," Wood wrote in Nature, "should certainly not have the face of a hominid less than one-third of its geological age."

Scientists suggest several possible explanations. Toumai could somehow be an ancestor of modern humans, or of